CLAIMS

What is claimed is:

1. A method for identifying a nucleotide, the method comprising the steps of:

(a) exposing a biological sample to a nucleic acid primer capable of hybridizing with a nucleic acid and comprising a donor molecule;

(b) performing a primer extension reaction in the presence of a nucleotide complementary to the target nucleotide and comprising an acceptor molecule capable of interacting with said donor molecule to produce a detectable signal; and

(c) identifying the target nucleotide incorporated into said primer as a function of said signal.

2. The method of claim 1, wherein said donor activates said acceptor to produce a detectable signal.

3. The method of claim 2, wherein said signal is a photo-emitting signal.

4. The method of claim 1, wherein said extension reaction is performed in the presence of at least two different nucleotides, each comprising a different acceptor molecule.

5. The method of claim 1, wherein less than all the nucleotides complementary to the target nucleotide comprise an acceptor.

6. The method of claim 4 wherein each acceptor molecule produces a distinct signal.

7. The method of claim 1, wherein said signal is a fluorescent signal characteristic of the donor-acceptor interaction.

8. The method of claim 1, wherein said donor and acceptor molecules comprise a fluorophore.

9. The method of claim 1, wherein said donor and acceptor molecules comprise a fluorescent dye.

10. The method of claim 9, wherein said fluorescent dye is selected from the group consisting of 6-carboxyfluorescein (FAM), 6-carboxy-X-rhodamine (REG), N_1, N_1 N^1, N^1-tetramethyl-6-carboxyrhodamine (TAMARA), 6-carboxy-X-rhodomine (ROX), fluorescein, Cy5® or LightCycler-Red 640.

11. The method of claim 1 wherein said donor molecule further comprises 6-carboxyfluorescein (FAM).

12. The method of claim 11 wherein said acceptor molecule comprises), 6-carboxy-X-rhodomine (ROX).

13. The method of claim 1 wherein said nucleotide is a chain-terminating nucleotide.

14. The method of claim 13 wherein said chain-terminating nucleotide is a dideoxy nucleotide.

15. The method of claim 13 wherein said chain-terminating nucleotide is a 2'3 '-dideoxy nucleotide triphosphates selected from the group consisting of ddATP, ddCTP, ddGTP, ddTTP and ddUTP.

16. The method of claim 1 wherein said nucleic acid is isolated from a biological sample selected from the group consisting of pus, semen, sputum, semen, saliva, cerebrospinal fluid, stool, urine, blood, biopsy tissue and lymph.

17. The method of claim 1 wherein said nucleic acid sample is obtained from stool.

18. The method of claim 1, wherein said target is a nucleic acid mutation.

19. The method of claim 15, wherein said mutation occurs in a gene selected from the group consisting of ras oncogenes, p53, dcc, apc, mcc and β-catenin.

20. A method for identifying a single nucleotide polymorphic variant, comprising the steps of:

exposing a sample to a first nucleic acid primer comprising a donor molecule, wherein said primer is capable of hybridizing to a nucleic acid in said sample at a locus immediately 5' to a single nucleotide polymorphic locus;

extending said primer in the presence of at least two nucleotides, each comprising a different acceptor molecule capable of interacting with said donor molecule to produce a detectable signal;

detecting said signal; and

identifying said one or more nucleic acids present at said polymorphic locus.

21. The method of claim 20, wherein said nucleotides are chain-terminating nucleotides.

22. The method of claims 1 or 17, wherein said biological sample is obtained from a pooled patient population.

23. The method of claim 22 wherein said pooled biological sample comprises a stool sample obtained from members of a patient population.